FIG.1

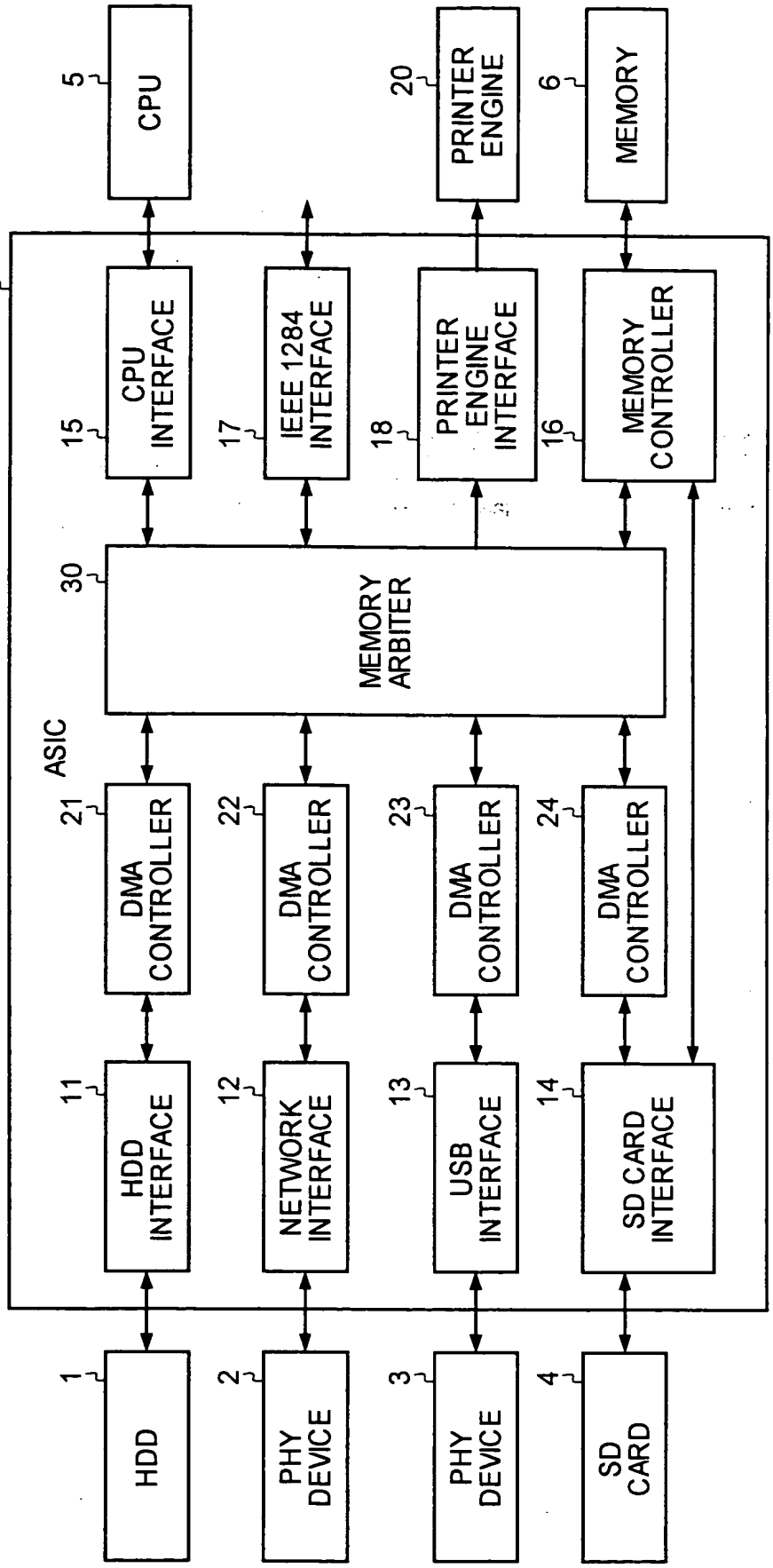

5
CPU
20
PRINTER ENGINE
6
MEMORY
10
ASIC
15
CPU INTERFACE
17
IEEE 1284 INTERFACE
18
PRINTER ENGINE INTERFACE
16
MEMORY CONTROLLER
30
MEMORY ARBITER
21
DMA CONTROLLER
22
DMA CONTROLLER
23
DMA CONTROLLER
24
DMA CONTROLLER
11
HDD INTERFACE
12
NETWORK INTERFACE
13
USB INTERFACE
14
SD CARD INTERFACE
1
HDD
2
PHY DEVICE
3
PHY DEVICE
4
SD CARD

FIG.2

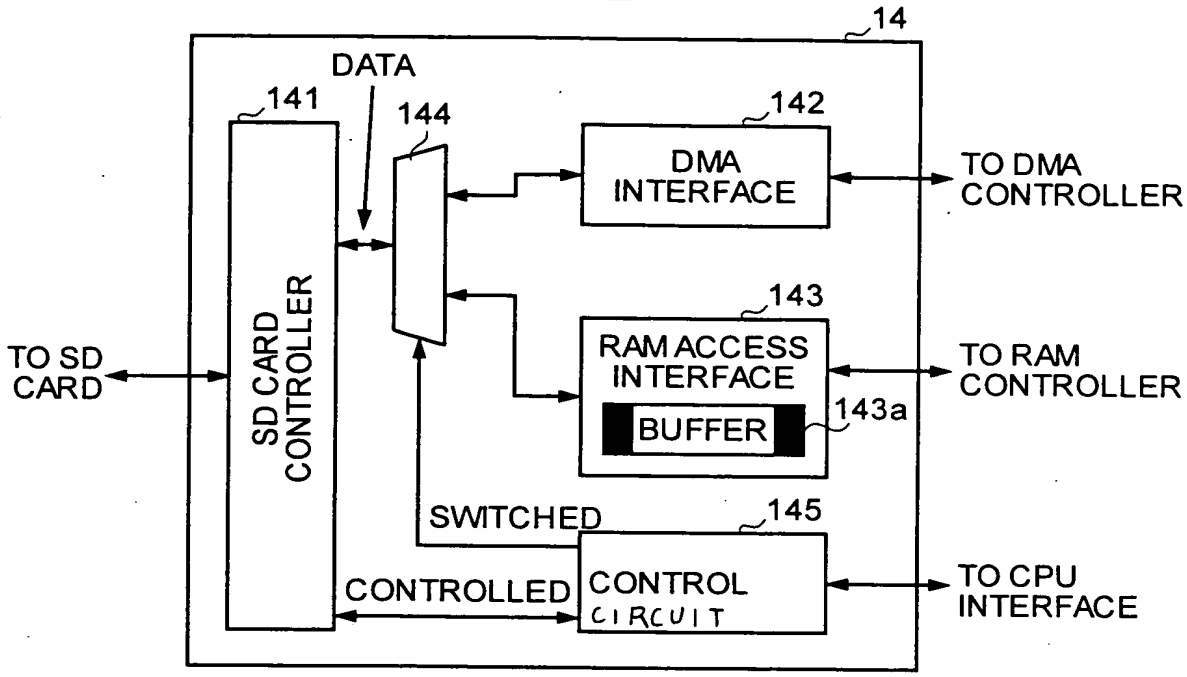

14
DATA
141
144
142
DMA INTERFACE
TO DMA CONTROLLER
143
RAM ACCESS INTERFACE
BUFFER
143a
TO RAM CONTROLLER
TO SD CARD
SD CARD CONTROLLER
SWITCHED
145
CONTROLLED
CONTROL CIRCUIT
TO CPU INTERFACE

FIG.3

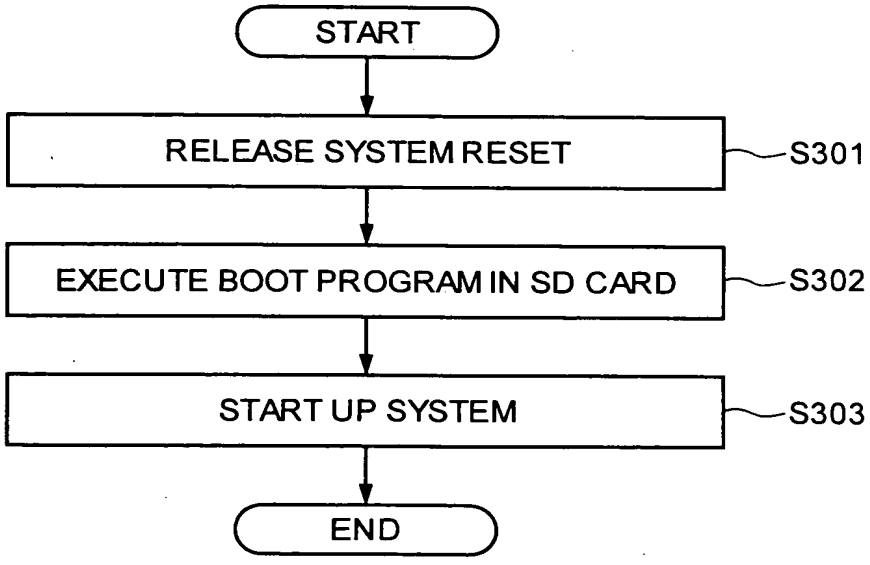

START
RELEASE SYSTEM RESET
S301
EXECUTE BOOT PROGRAM IN SD CARD
S302
START UP SYSTEM
S303
END

FIG.4

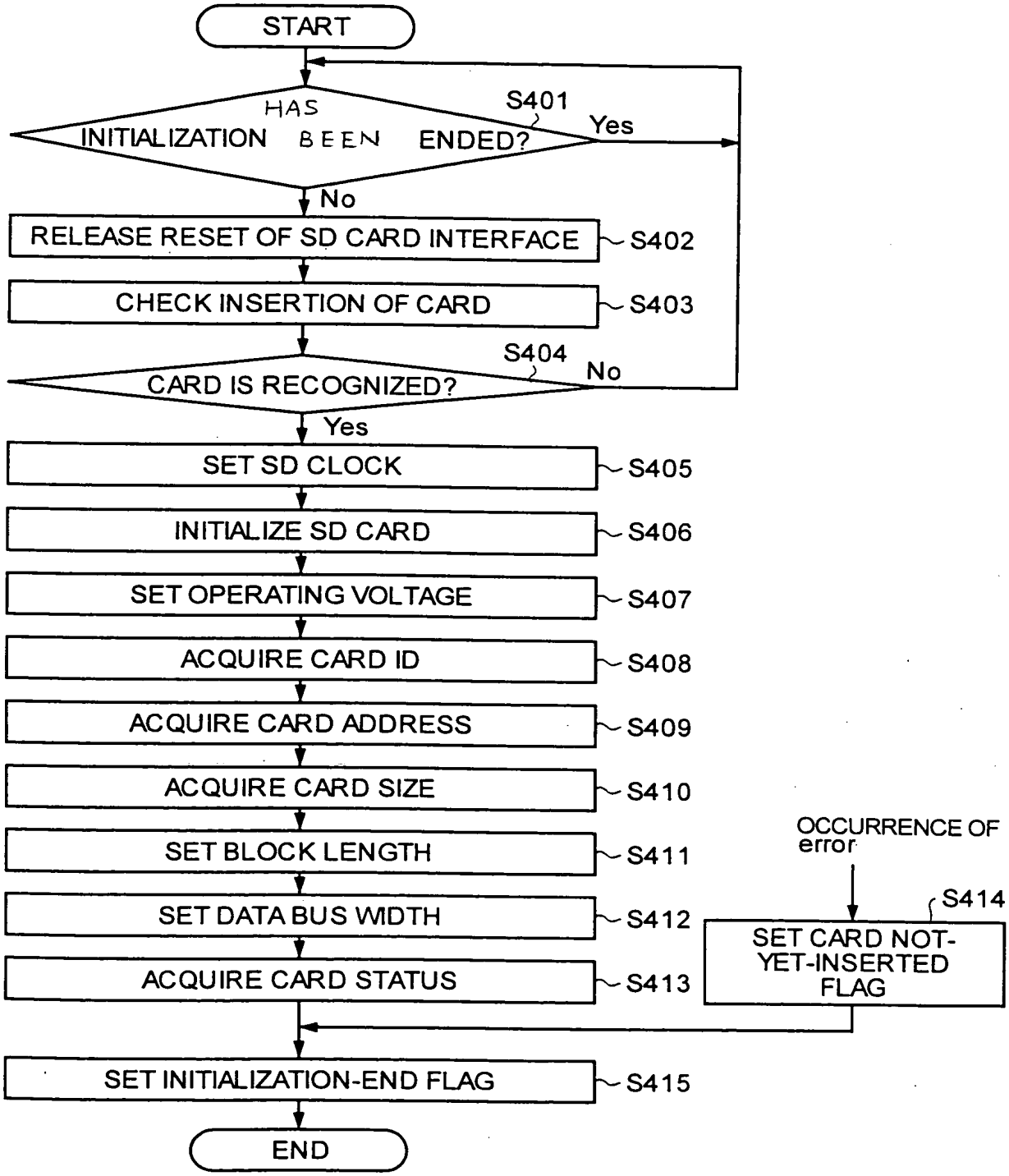

START
HAS INITIALIZATION BEEN ENDED?
S401
Yes
No
RELEASE RESET OF SD CARD INTERFACE
S402
CHECK INSERTION OF CARD
S403
CARD IS RECOGNIZED?
S404
No
Yes
SET SD CLOCK
S405
INITIALIZE SD CARD
S406
SET OPERATING VOLTAGE
S407
ACQUIRE CARD ID
S408
ACQUIRE CARD ADDRESS
S409
ACQUIRE CARD SIZE
S410
SET BLOCK LENGTH
S411
SET DATA BUS WIDTH
S412
ACQUIRE CARD STATUS
S413
OCCURRENCE OF error
S414
SET CARD NOT-YET-INSERTED FLAG
SET INITIALIZATION-END FLAG
S415
END

FIG.5

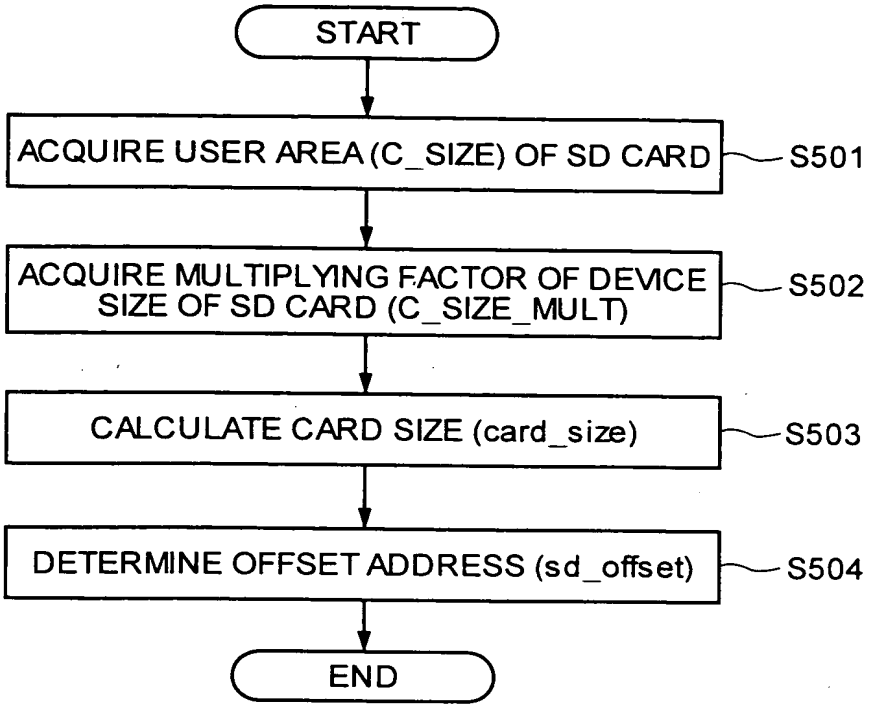

START
ACQUIRE USER AREA (C_SIZE) OF SD CARD
S501
ACQUIRE MULTIPLYING FACTOR OF DEVICE SIZE OF SD CARD (C_SIZE_MULT)
S502
CALCULATE CARD SIZE (card_size)
S503
DETERMINE OFFSET ADDRESS (sd_offset)
S504
END

FIG.6

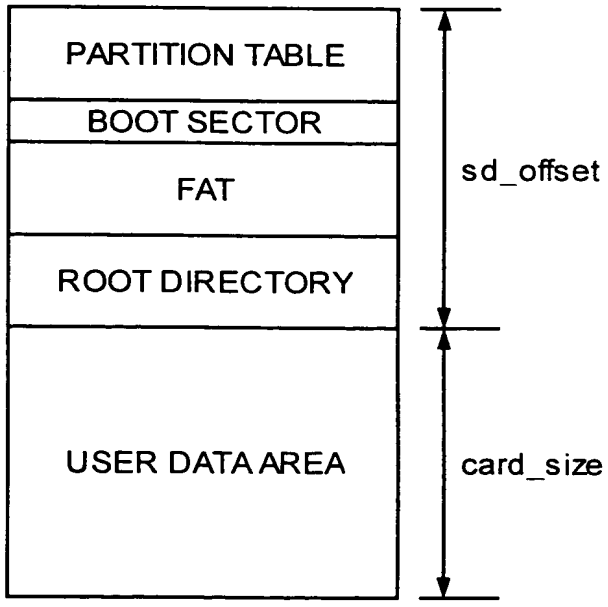
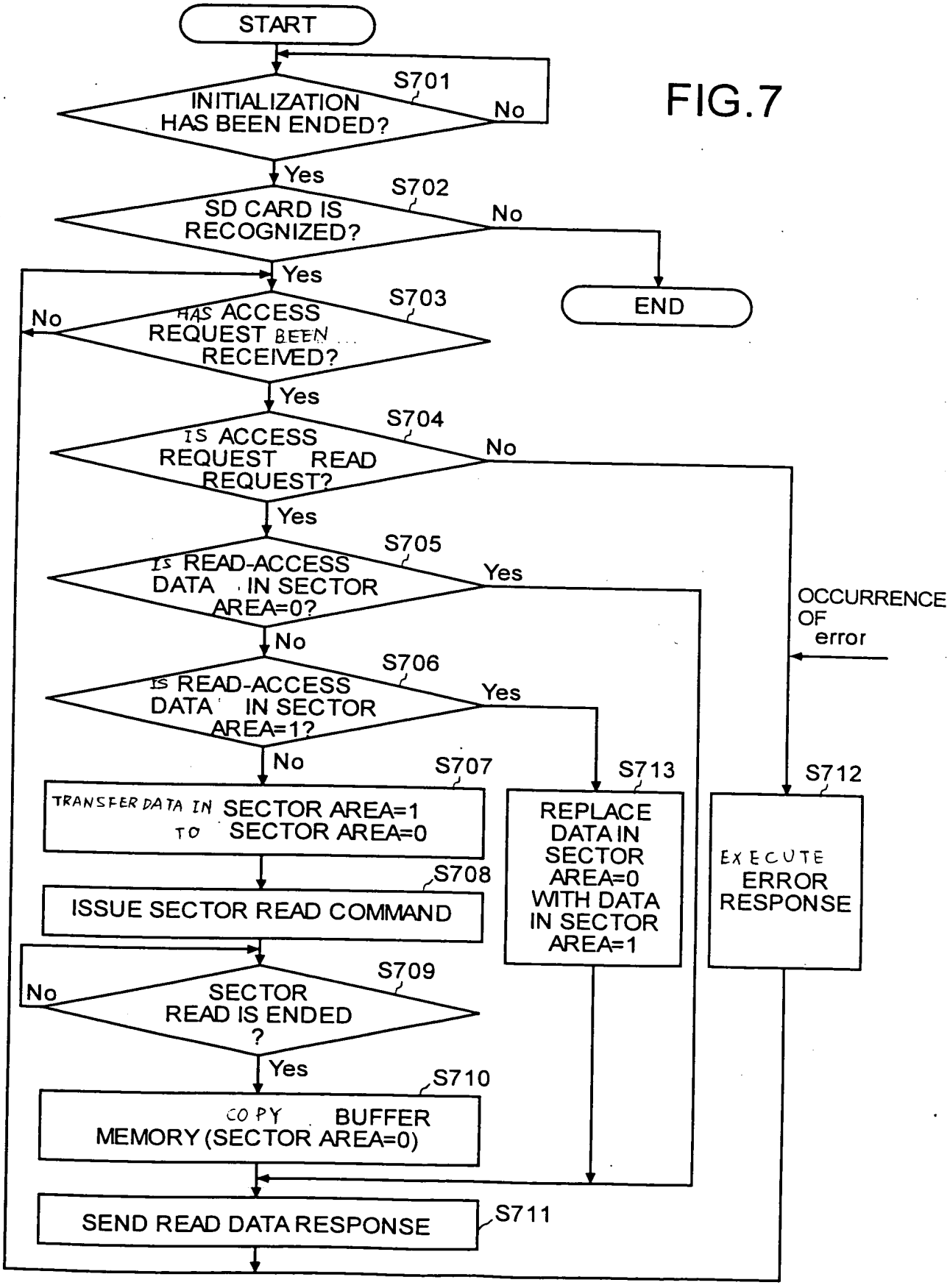

PARTITION TABLE
BOOT SECTOR
FAT
ROOT DIRECTORY
USER DATA AREA
sd_offset
card_size

FIG.7


START
S701
INITIALIZATION HAS BEEN ENDED?
No
Yes
S702
SD CARD IS RECOGNIZED?
No
END
Yes
S703
No
HAS ACCESS REQUEST BEEN RECEIVED?
Yes
S704
IS ACCESS REQUEST READ REQUEST?
No
Yes
S705
IS READ-ACCESS DATA IN SECTOR AREA=0?
Yes
No
S706
IS READ-ACCESS DATA IN SECTOR AREA=1?
Yes
No
S707
TRANSFER DATA IN SECTOR AREA=1 TO SECTOR AREA=0
S708
ISSUE SECTOR READ COMMAND
S709
No
SECTOR READ IS ENDED ?
Yes
S710
COPY BUFFER MEMORY (SECTOR AREA=0)
S711
SEND READ DATA RESPONSE
S713
REPLACE DATA IN SECTOR AREA=0 WITH DATA IN SECTOR AREA=1
OCCURRENCE OF error
S712
EXECUTE ERROR RESPONSE